CLAIMS

1. A method for producing a compound semiconductor single crystal by a liquid encapsulated Czochralski method, comprising:

containing a semiconductor raw material and an encapsulating material in a raw material melt-containing portion comprising a first crucible and a second crucible, the first crucible having a bottom and a cylindrical shape, and the second crucible being disposed in an inside of the first crucible and having a bottom portion thereof provided with a communication hole communicating with the first crucible;

melting the raw material by heating the raw material melt-containing portion; and

growing a crystal by making a seed crystal be in contact with a surface of the raw material melt in a state covered with the encapsulating material and by pulling up the seed crystal,

wherein a heater temperature is controlled so that a diameter of a growing crystal becomes approximately equal to an inner diameter of the second crucible, and the crystal is grown by maintaining a surface of the growing crystal in a state covered with the encapsulating material until termination of crystal growth.

2. The method for producing a compound semiconductor single crystal as claimed in claim 1, wherein an amount of the encapsulating material to be added is set to an amount such that the encapsulating material is capable of filling a space generated between the growing crystal and the second crucible in accordance with the crystal growth and covering an entire surface of the growing crystal.

3. The method for producing a compound semiconductor single crystal as claimed in claim 2, wherein a crucible having a tapered structure in which an inner diameter of a bottom portion of the crucible is smaller than an inner diameter of a top portion of the crucible is used as the second crucible.

4. The method for producing a compound semiconductor single crystal as claimed in claim 3, wherein the second crucible has a side face thereof tilted with respect to a vertical direction within a range of 0.2° to 10°.

5. The method for producing a compound semiconductor single crystal as claimed in any one of claims 1 to 4, wherein the crystal growth is performed in a state of the second crucible being dipped in the raw

material melt contained in the first crucible to a depth within a range of 10 mm to 40 mm.

6. The method for producing a compound semiconductor single crystal as claimed in any one of claims 1 to 5, wherein a diameter of the communication hole is not more than 1/5 of the inner diameter of the second crucible.

7. The method for producing a compound semiconductor single crystal as claimed in any one of claims 1 to 6, wherein a temperature gradient in the raw material melt is set to at least not more than 20°C/cm.